

Flight Scientist Report
Tuesday 03/30/2021 ACTIVATE RF59

Flight Type: Statistical Survey Flight

Flight Route: KLF I Atlic zibut 37.5/-71.6 36.2/-71.22 34.6/-70.76 36.88/-71.42 zibut atlic KLF I

Special Notes: 2nd flight of a 2 flight day. This one is coordinated with CALIPSO overpass in an areas of cold air outbreak clouds.

King Air

Pilot report (Wusk): Take-off 1301 Lndg 1639 3.6 hours

2nd flight of the day, dual aircraft research flight with the HU25. Planned route was KLF I ATLIC ZIBUT 3730N07136W 3612N07112W 3436N07047W 3653N07125W ZIBUT ATLIC KLF I. UC12 Crew3 was Coldsnow, Wusk, Shingler. Take-off was about 5 minutes early to ensure CALIPSO overpass time in spite of LFI airfield pending traffic. Flight had good coincidence with HU25 and arrival at the planned point for overflight was about 5 minutes early. An extra sonde was dropped at overpass time in addition to the 5 planned. A slightly early turn on the westbound leg returning to ZIBUT was requested and flown. Aircraft performed well and should be ready for next event.

Flight scientist report (Shingler): On the second joint flight of the day, we flew a CALIPSO track east of ZIBUT. We flew out of AR9 and NE out of ZIBUT to pick up the line and flew SSE on the line for max duration and we returned on the same line until reaching the extent of the lower cloud deck at which point we flew direct to ZIBUT so the Falcon could remain in-cloud and back to KLF I. Falcon flight scientists noted a cloud boundary near this northern end of the cloud field; however, there were not significant features indicating a change in the real time lidar products. Five sondes were dropped on this flight (ZIBUT, N end of CALIPSO track, mid CALIPSO track (at satellite overpass time, and S end of CALISPO track, coast). All instruments were operational.

Falcon

Pilot report (Delaney): Science flight for the HU-25 in support of ACTIVATE Campaign #3, conducted cooperatively with the UC-12. Departed Rwy08 to ATLIC climbing to 3k ft MSL for initial transit. Research profiles conducted from KLF I-ATLIC-ZIBUT-3730N/07136-3612N/07113.2W-3436N/07045.6W-3652.8N/07125.2W-ATUGI-ZIBUT-ATLIC-KLF I. Winds were light (<15 knots) and variable (120-210) at flight altitudes with a scattered offshore layer initially encountered from ~3-4 k FT MSL (ATLIC-ZIBUT), followed by a clear section approaching ZIBUT before re-entering layers transiting to first Lat/Long. Tuned approximately 10 nmi early on return leg to ZIBUT in order to remain within cloud layer. Both cloud and clear air modules were completed throughout the flight as conditions warranted, ranging from 500 – 5500 FT

MSL. A temperature inversion was noted from ~2500-5500 ft MSL with a transition from ~4 to ~12 deg C, respectively. Synchronized with CALIPSO overpass just beyond the second Lat/Long position. Aircraft geolocation was within ~5 nmi throughout the flight. All objectives were achieved and no system discrepancies were noted - pending post-flight data analysis.

Pilots: Slover/Delaney

QNCs: Crosbie/Winstead

Flight scientist report (Crosbie): Notable cloud boundary which appeared to be collocated with the Gulf Stream with clear sky over the colder water to the north.

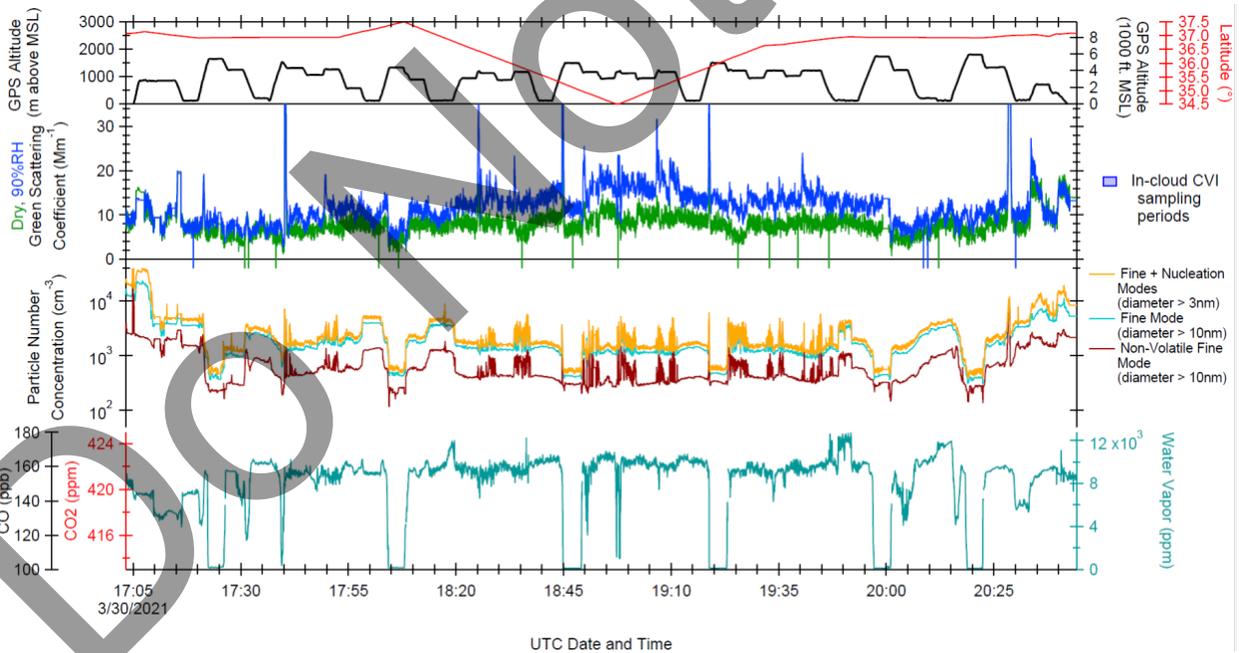
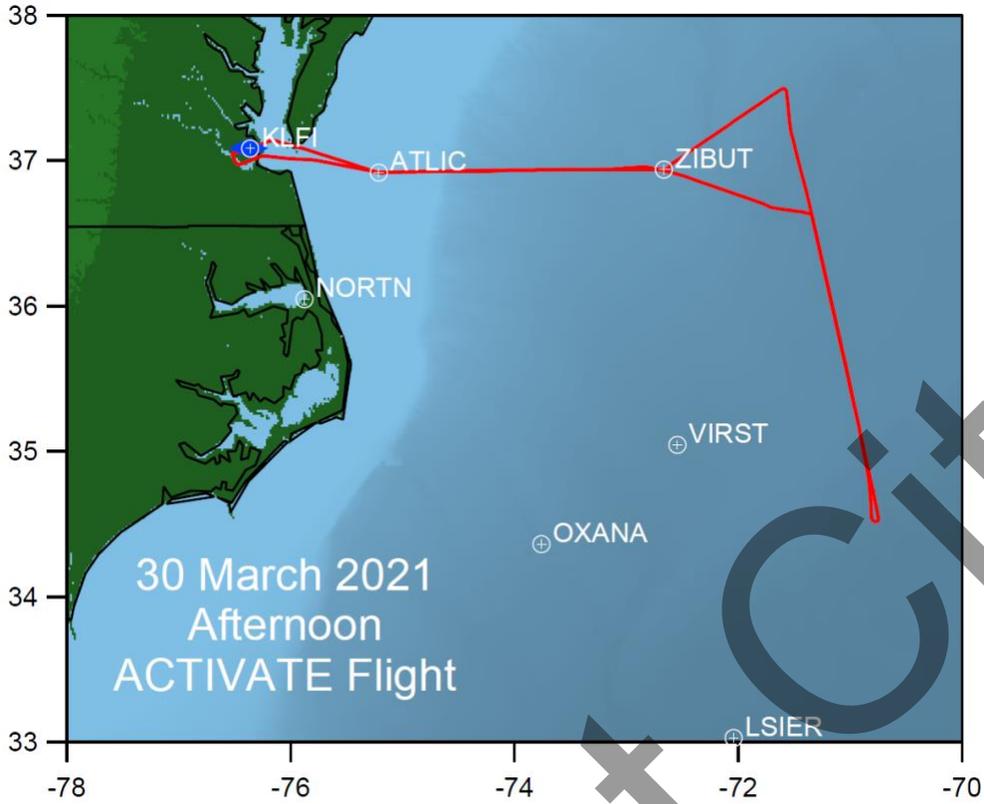
Clouds were very uniform in vertical extent throughout the flight. Too thin to differentiate the ACB and BCT and limited LWC ($<0.1\text{g}/\text{m}^3$) made CW collection difficult. Only 2 small samples were collected despite a large amount of time in cloud.

Timing for the CALIPSO coordination was successful

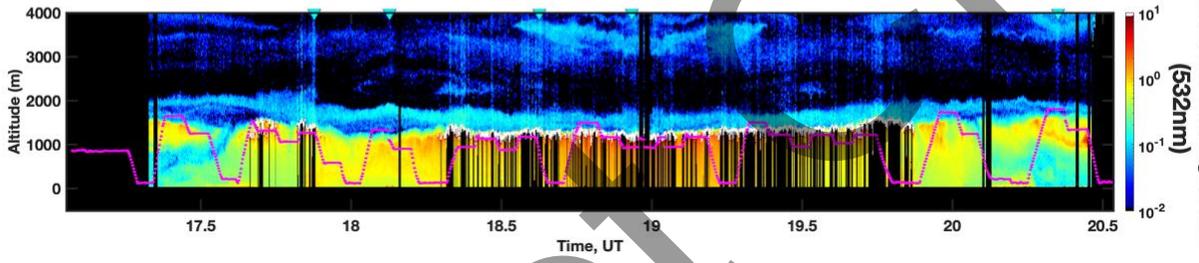
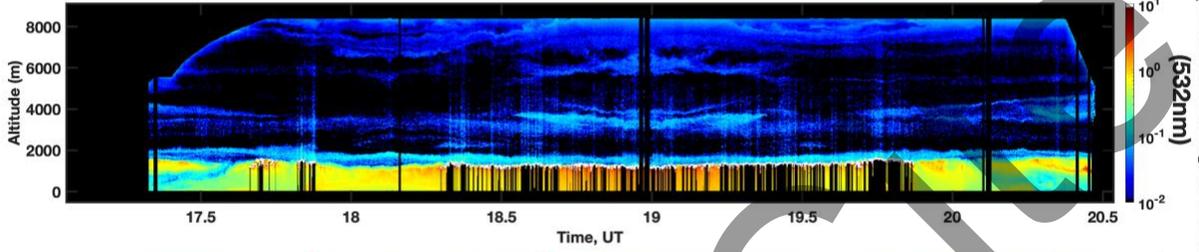
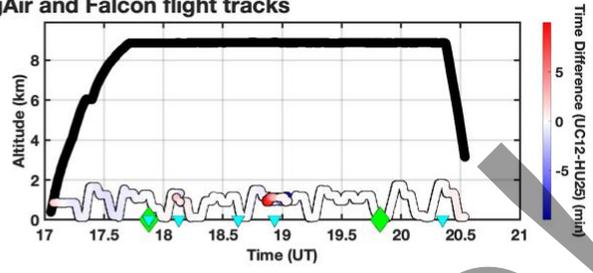
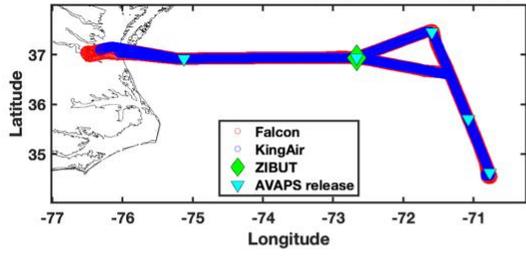
Near the cloud edge there was a line of lower cloud bases which appeared to be associated with moisture convergence over the Gulf Stream. There were significant gradients observed in this region both in the near surface water vapor and also the temperature profile. There appeared to be some correlation in CN and we noted increased turbulence. To the north of the cloud edge the pilots reported northerly winds.

A significant aerosol plume was intercepted during descent in one of the clear modules on the return leg in the vicinity of ATLIC. We could not identify the source at the time however it was not associated with cloud artifact.

Note from Simon: The Quicklooks show cloud without precip during the morning flight and a transition to clouds with precip in the afternoon flight. There were also some ice particles in the afternoon flight, but not in mixed phase clouds. The afternoon flight had more noise in the 2DS data.



20210330 - ACTIVATE - KingAir and Falcon flight tracks



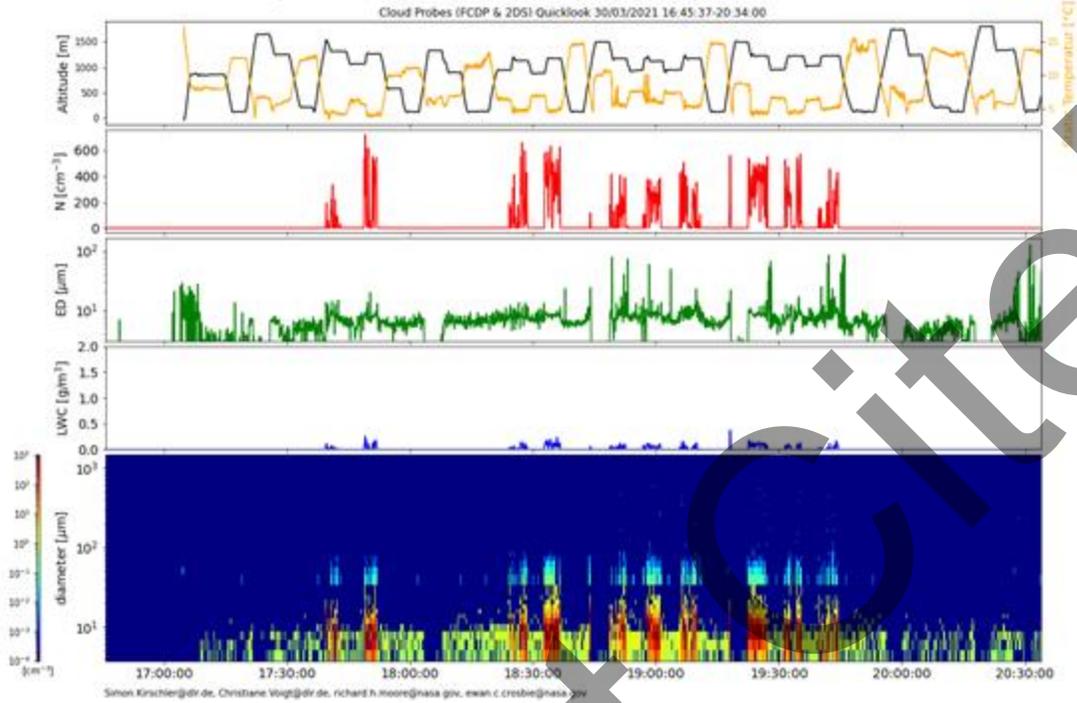
532nm backscatter (532nm)

Do Not

Quicklook ACTIVATE Cloud Probes (FCDP & 2DS) Quicklook

preliminary data, only for quicklook use

Simon Kirschler, Christiane Voigt, Richard Moore, Ewan Crosbie



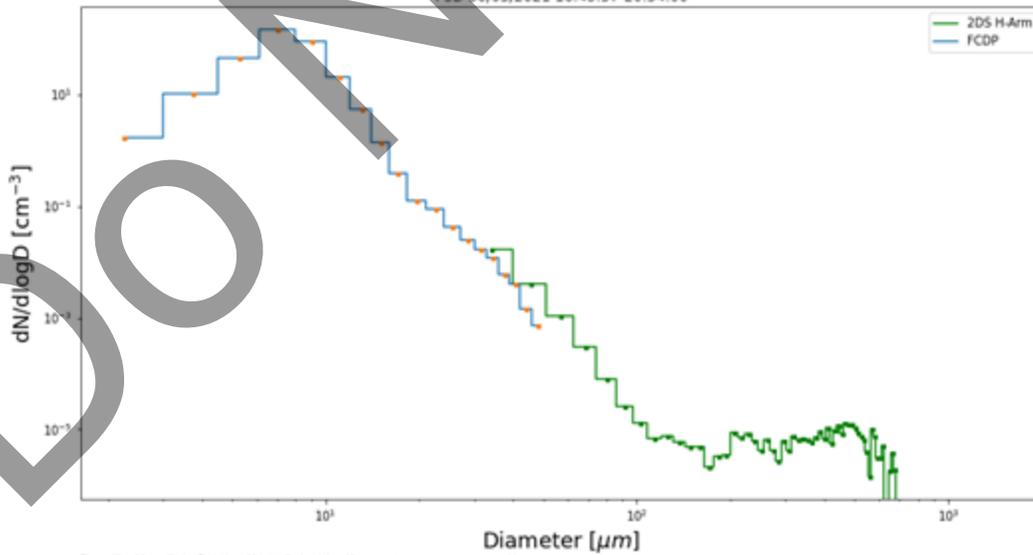
PSD ACTIVATE

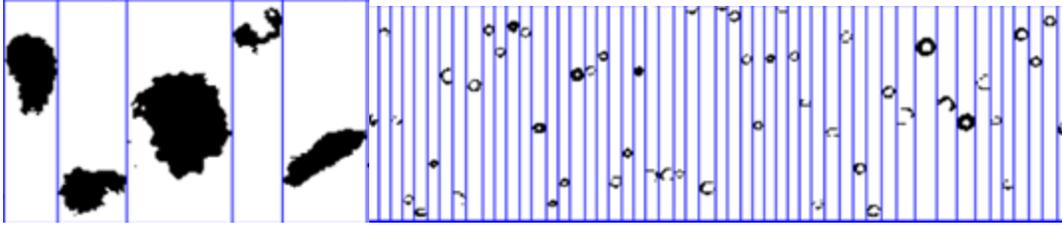
preliminary data, only for quicklook use

Simon Kirschler, Christiane Voigt, Richard Moore, Ewan Crosbie



PSD 30/03/2021 16:45:37-20:34:00

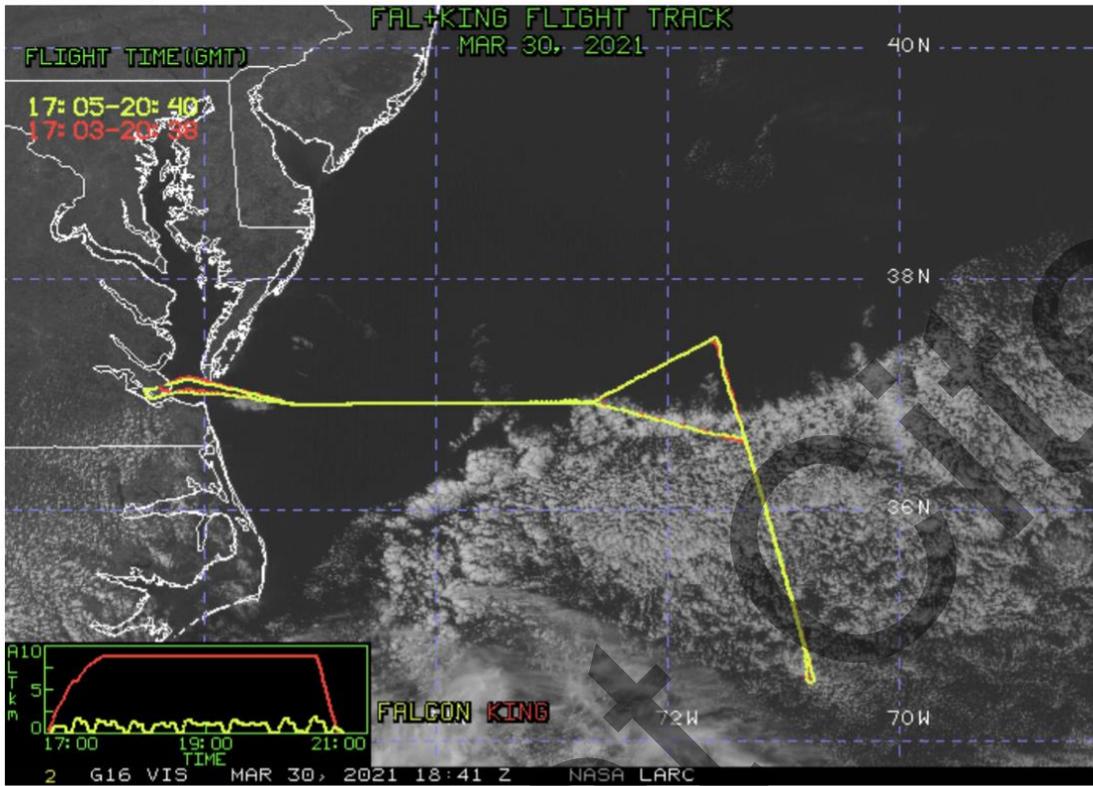




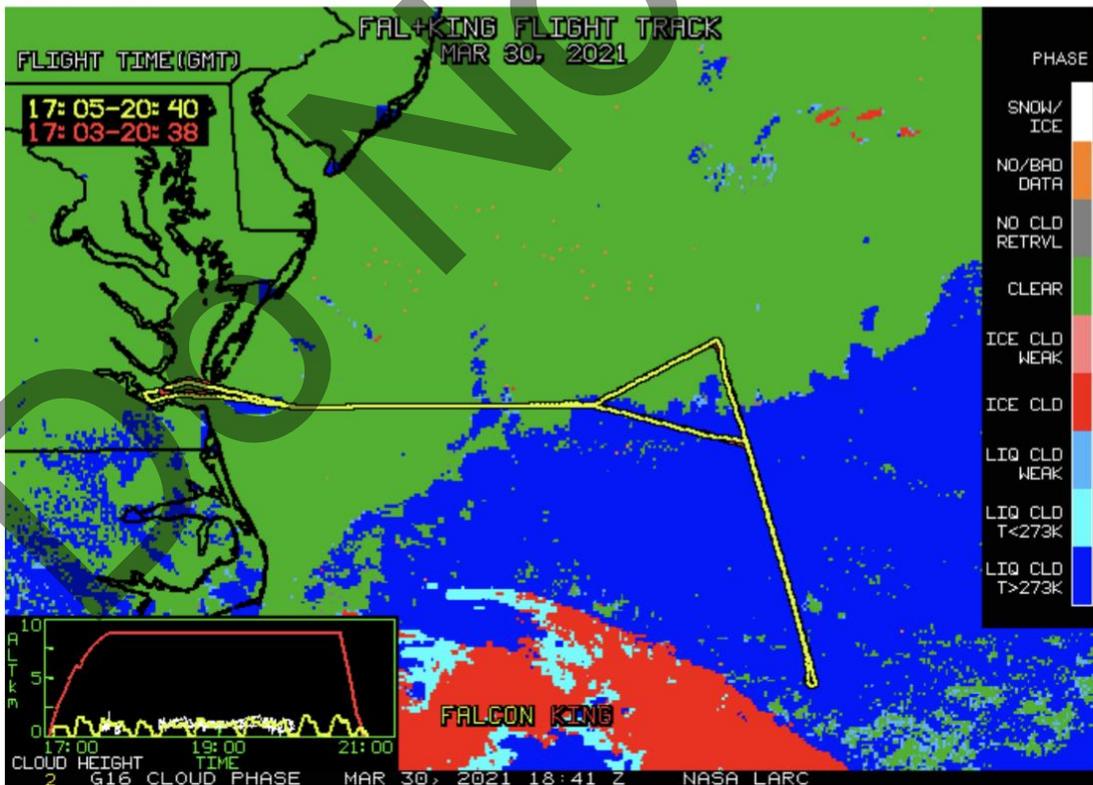
Mainly pure liquid clouds. Few ice particles measured, but not in cloud or mixed phase.

Do Not Cite!

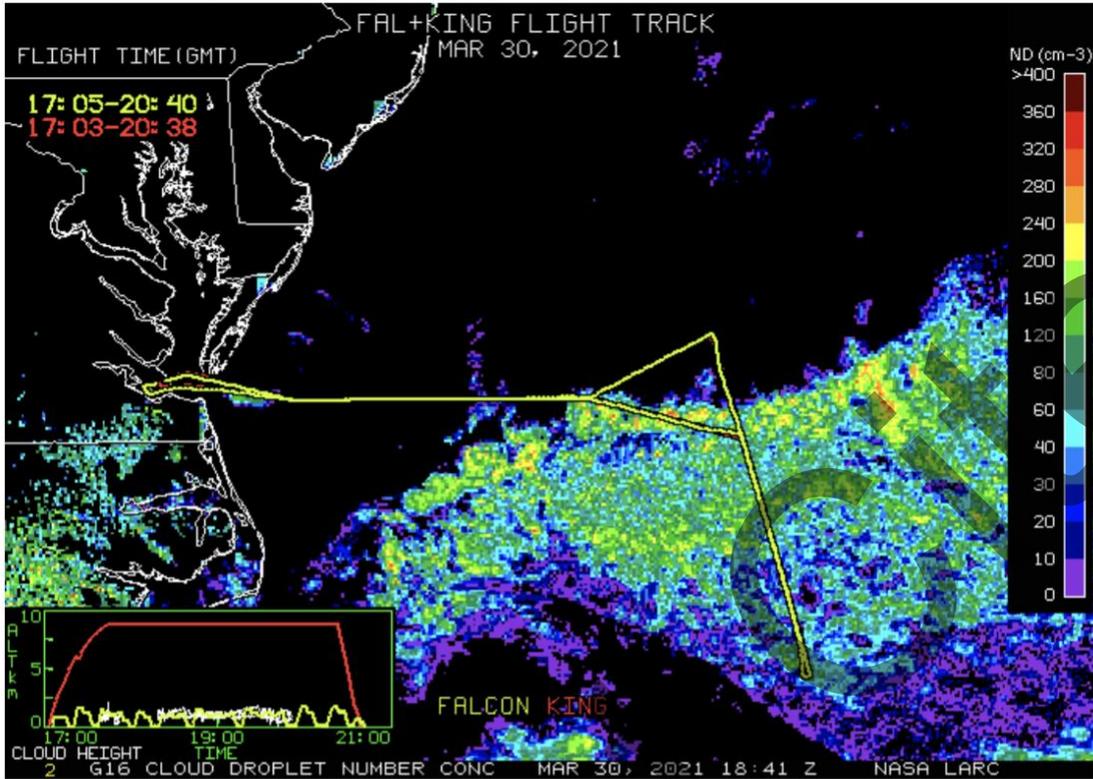
NASA-LaRC Clouds Group GOES-16 Quicklook Images for Flight 59, 18:41 UTC Mar 30, 2021
Visible Image



Cloud Phase



Cloud Droplet Number Concentration (cm-3)



Cloud-Top Height (Kft-ASL)

